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REMARKS

Applicants thank Examiner Sawhney for the in-person interview on March 23, 2006 with Inventor Krupa and Applicants' attorneys Sandra A. Brockman-Lee and Joseph A. Capraro. Applicants appreciate the helpful comments during the interview. The Examiner agreed that claims including language regarding the direct contact between the fiber optic and the light-emitting region of the light-light emitting device, and language regarding the dimensional compatibility of the light receiving surface of the fiber optic and the light-emitting region of the solid state light source "appears more definite in reflecting the invention." The following new claims are submitted which include the language discussed with the Examiner.

Summary of Claim Amendments

Claim 1-37 as originally filed have been cancelled. New Claims 38-61 are submitted. Claims 38 and 50 are supported by claims 1-23 as originally filed and by page 6, lines 9-19 and page 10, lines 4-21, of the specification.

Objection to the Drawings

In the Office Action made final, the drawings were objected to under 37 C.F.R. 1.83(a). Claims 23, 24, and 26 have been canceled, thereby obviating the rejection. Withdrawal and reconsideration of the objection are respectfully requested.

Objection to the Specification

In the Office Action made final, the specification was objected to under 37 C.F.R. 1.75(d)(1). Claims 23, 24, and 26 have been canceled, thereby obviating the rejection. Withdrawal and reconsideration of the objection are respectfully requested.

Objections to Claims

The Examiner objected to claims 1-37 because of "informalities." In particular, independent claims 1, 25, 26, 39, 30, 32, and 34 were objected to for the recitation "a solid state light emitting device without an encasement." In the Office Action made final, the Examiner

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recommended the language "a bare-chip solid-state light emitting device without having a covering on the light emitting surface of the chip."¹ Claim 1 has been canceled.

In addition, as discussed during the interview of March 23, 2006, new claims 38 and 50 recite "light-emitting device having a light emitting region without having an encasement on the light emitting region." Applicants believe that this language overcomes the objection. Claim 8 was objected to for the recitation of "a bundle of a large number of small diameter individual fibers." Claim 8 has been canceled. In addition, new claims 42 and 54 recite "a bundle of optic fibers." Applicants believe that this language overcomes the objection. Withdrawal and reconsideration of the objections are respectfully requested.

Rejection of Claims under 35 U.S.C. § 102(b) over Matsubara

Claims 1, 2, 8, 10-13, 29, 30, 32, and 34-36 were rejected under 35 U.S.C. § 102(b) as being anticipated by Matsubara (JP 5264871). Claims 1, 2, 8, 10-13, 29, 30, 32, and 34-36 have been cancelled, thereby obviating the rejection.

New claim 50 is drawn to an illumination device, comprising a high-power solid state light-emitting device having a light emitting region without having an encasement on the light emitting region, and a fiber optic light guide comprising a light-receiving end and a light-transmitting end. According to claim 50, the light receiving end is placed directly against the light emitting region of the light-emitting device, and is configured to match the size and shape of the light-emitting surface of the light-emitting device.

Matsubara is a telecommunication application that describes an assembly method and jig for aligning LED emitters and fiber optics within a connector pair. Matsubara teaches the use of alignment holes 51 and 52, which, when properly positioned, pass an external laser beam 81 and 82 through the alignment holes. By measuring the intensity of the laser passing through these holes, alignment of the LED 31-34 and the fiber 4 can be accomplished without powering the LEDs. As shown in the Figure, there is a gap between the LEDs 31-34 and the optical fiber 4. Matsubara specifically teaches a spaced separation between the optical fibers and the LED.

¹ Office Action dated February 17, 2006, page 4, first paragraph.

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Matsubara teaches that the optical fiber supporting part 1 is brought into contact with the base 2². However, as shown in the Figure, the LED chips are contained within a recessed portion of base 2³.

Matsubara does not disclose or suggest a high-power solid state light-emitting device having a light emitting region without having an encasement on the light emitting region. There is nothing in Matsubara to suggest that anything other than standard LED chips are used, which are typically sold with an encasement. In addition, Matsubara does not disclose or suggest a fiber optic light guide where the light receiving end is placed directly against the light emitting region of the light-emitting device. Furthermore, Matsubara does not disclose or suggest a fiber optic light guide configured to match the size and shape of the light-emitting surface of the light-emitting device.

Therefore, for at least these reasons, new claim 50 is novel over Matsubara. New claims 51-60 are dependent upon claims 50. Therefore, claims 51-60 are also novel over Matsubara. Withdrawal and reconsideration of the rejection over Matsubara are respectfully requested.

Rejection of Claims under 35 U.S.C. § 102(b) over Goodwin

Claims 1, 2, 15, 21, and 22 were rejected under 35 U.S.C. § 102(b) as being anticipated by Goodwin (U.S. Patent No. 5,586,207 B2). Claims 1, 2, 15, 21, and 22 have been canceled, thereby obviating the rejection.

New independent claim 50 is drawn to an illumination device as discussed above.

Goodwin teaches "methods and assemblies for packaging opto-electronic devices and for coupling optical fibers to the packaged devices."⁴ As shown in Figures 5, 7, and 8, both the edge-emitting laser 310 and the opto-electronic device 310³ are on one side of a window of substantially parallel optical fiber sections joined side-by-side 100, and the optical fiber 320 is on the other side of the window of substantially parallel optical fiber sections joined side-by-side.⁵ According to Goodwin, the opto-electronic device can be surface-emitting lasers, LEDs and

² Matsubara, page 1, Abstract.

³ Matsubara, page 1, Figure.

⁴ Goodwin, Title.

⁵ Goodwin, Figure 1, col. 3, lines 65-66, Figure 5, col 4, line 60 through col. 5, line 25, and Figure 7, col. 7, lines 14-31.

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detectors.⁶ In addition, Goodwin teaches that the opto-electric device is in a cavity of a housing adjacent to a window of a plurality of substantially parallel optical fiber sections joined side-by-side and that the optical fiber is aligned with the opto-electronic device through the window of a plurality of substantially parallel optical fiber sections joined side-by-side.⁷

Goodwin does not disclose or suggest a high-power solid state light-emitting device having a light emitting region without having an encasement on the light emitting region. There is nothing in Goodwin to suggest that anything more than standard LEDs are used, which are typically sold with an encasement. In addition, Goodwin does not disclose or suggest a fiber optic light guide where the light receiving end is placed directly against the light emitting region of the light-emitting device. Furthermore, Goodwin does not disclose or suggest a fiber optic light guide configured to match the size and shape of the light-emitting surface of the light-emitting device.

Therefore, for at least these reasons, new claim 50 is novel over Goodwin. Claims 51-60 are dependent upon claim 50. Therefore, claims 51-60 are also novel over Goodwin. Withdrawal and reconsideration of the rejection over Goodwin are respectfully requested.

Rejection of Claims under 35 U.S.C. § 103(a)

Claims 3-7, 23, 31, and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsubara in view of Kazakevich (U.S. Patent No. 6,921,920 B2). Claims 3-7, 23, 31, and 37 have been cancelled.

New claims 53 and 53 are dependent upon claims 50 and are essentially the same as claims 5 and 7, respectively. Independent claim 50 is drawn to an illumination device as discussed above.

The combined teachings of Matsubara and Kazakevich do not disclose or suggest the invention of claim 50. The limitations of Matsubara are described above. Kazakevich does not remedy the deficiencies of Matsubara because like Matsubara, Kazakevich does not disclose or suggest a high-power solid state light-emitting device having a light emitting region without having an encasement on the light emitting region. Furthermore, like Matsubara, Kazakevich

⁶ Goodwin, col. 7, lines 61-63.

⁷ Goodwin, col. 2, lines 27-36.

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does not disclose or suggest a fiber optic light guide configured to match the size and shape of the light-emitting surface of the light-emitting device. Therefore, the combined teachings of Matsubara and Kazakevich fail to disclose or suggest the claimed illumination device.

For at least these reasons, new claim 50 is non-obvious over the teachings of Matsubara in view of Kazakevich. Claims 51-60 are dependent upon claim 50. Therefore, claims 51-60 are also non-obvious over the teachings of Matsubara in view of Kazakevich. Withdrawal and reconsideration of the rejection over Matsubara in view of Kazakevich are respectfully requested.

Rejection of claim 9 over Matsubara

Claim 9 was rejected as being unpatentable over Matsubara. Claim 9 has been cancelled.

New claim 55 is dependent upon claim 50 and is essentially the same as claim 9. Claim 55 is drawn to an illumination device where the fibers have diameters of about 30-50 micrometers. As discussed above, the Matsubara does not disclose or suggest the invention of independent claim 50. Matsubara does not disclose or suggest a high-power light-emitting device having a light emitting region without having an encasement on the light emitting region. There is nothing in Matsubara to suggest that anything more than standard LED chips are used, which are typically sold with a lens encasement. In addition, Matsubara does not disclose or suggest a fiber optic light guide where the light receiving end is placed directly against the light emitting region of the light-emitting device. Furthermore, Matsubara does not disclose or suggest a fiber optic light guide configured to match the size and shape of the light-emitting surface of the light-emitting device. Claim 55 includes all of the elements of claim 50. Therefore, for at least these reasons claim 55 is non-obvious over Matsubara. Withdrawal and reconsideration of the rejection over Matsubara are respectfully requested.

Rejection of claim 24 over Matsubara in view of Kazakevich and further in view of Matsumoto

Claim 24 was rejected as being unpatentable over Matsubara in view of Kazakevich and further in view of Matsumoto (U.S. Patent No. 6,318,887 B1). Claim 24 has been cancelled.

New claim 61 is dependent upon claim 50 and is essentially the same as claim 24. Claim 61 is drawn to an illumination device further comprising a light-emitting device battery power

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source. As described above, the combined teachings of Matsubara and Kazakevich do not disclose or suggest the invention of claim 50.

Matsumoto teaches the use of one or more LED chips arranged on a transparent base board 16 to project their output light along an optical axis that contains a reflector 20 and/or a focusing 22 or condensing 27 lens.⁸ The optical elements 20, 22, and 27 collect the light emitted by the LEDs and focus this light onto the light guide 5. As shown in Matsumoto, there is no direct contact between the light emitting surface of the light emitting region of the light emitting device and the light guide.

Matsumoto does not remedy the deficiencies of the combined teachings of Matsubara and Kazakevich. Like Matsubara and Kazakevich, Matsumoto does not disclose or suggest a fiber optic light guide where the light receiving end is placed directly against the light emitting region of the light-emitting device. In addition, like Matsubara and Kazakevich, Matsubara does not disclose or suggest a fiber optic light guide configured to match the size and shape of the light-emitting surface of the light-emitting device. Claim 61 includes all of the elements of claim 50. Therefore, for at least these reasons, claim 61 is non-obvious over Matsubara in view of Kazakevich and further in view of Matsumoto. Withdrawal and reconsideration of the rejection over Matsubara in view of Kazakevich and further in view of Matsumoto are respectfully requested.

Rejection of claims 14, 25, and 33 over Matsubara in view of Ono

Claims 14, 25, and 33 were rejected as being unpatentable over Matsubara in view of Ono (U.S. Patent No. 4,212,021). Claims 14, 25, and 33 have been cancelled.

New claim 50 is drawn to an illumination device comprising a high-power solid state light-emitting device having a light emitting region without having an encasement on the light emitting region, and a fiber optic light guide comprising a light-receiving end and a light-transmitting end. According to claim 50, the light receiving end is placed directly against the light emitting region of the light-emitting device, and is configured to match the size and shape of the light-emitting surface of the light-emitting device.

⁸ See, for example, Matsumoto, Figures 1 and 2B; col. 1, line 58 through col. 2, line 1; col. 3, lines 5-23.

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The combined teachings of Matsubara and Ono do not disclose or suggest the invention of claim 50. The limitations of Matsubara are described above. Ono describes a method of manufacturing a red or infrared LED specifically to be used in the telecommunications field. The semiconductor materials taught by Ono produce light at 830 nm, the near infra-red region of the spectrum, where telecommunications fibers have excellent transmission.⁹ The method and resulting LED, are not suited for illumination of an object. Rather, they are tailored towards optical communications applications.¹⁰ In addition, Ono teaches a light emitting device where the optical fiber is brought into close contact with a light extracting window of an LED chip.¹¹

Ono does not remedy the deficiencies of Matsubara because like Matsubara, Ono does not disclose or suggest a fiber optic light guide where the light receiving end is placed directly against the light emitting region of the light-emitting device. Furthermore, like Matsubara, Ono does not disclose or suggest a fiber optic light guide configured to match the size and shape of the light-emitting surface of the light-emitting device.

Therefore, for at least these reasons, claim 50 is non-obvious over Matsubara in view of Ono. Withdrawal and reconsideration of the rejection over Matsubara in view of Ono are respectfully requested.

Rejection of Claims 26-28 over Hartung

Claims 26-28 were rejected as being unpatentable over Hartung (U.S. Patent No. 6,932,559).

New claim 38 is drawn to an endoscope comprising a high-power solid state light-emitting device having a light emitting region without having an encasement on the light emitting region, and a fiber optic light guide comprising a light-receiving end and a light-transmitting end. According to claim 38, the light receiving end is placed directly against the light emitting region of the light-emitting device, and is configured to match the size and shape of the light-emitting surface of the light-emitting device.

⁹ Ono, col. 6, lines 3-14.

¹⁰ Ono, col. 1, lines 8-14.

¹¹ Ono, Figures 6A and 6B, col. 5, line 65 through col. 6, line 2.

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Hartung teaches a dental epoxy curving device having multiple, low power LEDs. The LEDs have a standard plastic dome lens structure encasement over the light emitting region. As shown in Figures 1 and 2, the LEDs are arranged so that their optical axes are directed at the input of a light guide. Hartung specifically teaches a space between the light emitting elements 12 and light absorbing unit 18.¹² According to Hartung, the light-absorbing unit 18 projecting from the front conical end of the housing, and as shown in Figure 1, the light emitting elements 12 are apart from the light-absorbing unit, outside of the front conical end of the housing.¹³

Hartung does not disclose or suggest a high-power solid state light-emitting device having a light emitting region without having an encasement on the light emitting region. As shown in Figures 1-3, there is nothing in Hartung to suggest that anything more than standard LED chips are used, which are typically sold with a lens encasement. In addition, Hartung does not disclose or suggest a fiber optic light guide where the light receiving end is placed directly against the light emitting region of the light-emitting device. Furthermore, Hartung does not disclose or suggest a fiber optic light guide configured to match the size and shape of the light-emitting surface of the light-emitting device.

Therefore, for at least these reasons, new claim 38 is non-obvious over Hartung. Claim 49 is dependent upon claim 38 and includes all of the element of claim 38. Therefore, claim 49 is also non-obvious over Hartung. Withdrawal and reconsideration of the rejection over Goodwin are respectfully requested.

¹² Hartung, Figures 1-3.

¹³ Hartung, Figure 1 and col. 6, lines 15-30.

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CONCLUSION

Applicants respectfully request favorable consideration of all pending claims. If the Examiner believes that a telephone conversation with Applicants' attorney would expedite allowance of this application, the Examiner is cordially invited to call the undersigned attorney at (617) 526-9617.

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Respectfully submitted,



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